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**ANALISIS THE TOTAL ECONOMICS VALUE OF THE MANGROVE  
FOREST AREA IN THE DEVELOPMENT OF ECOTOURISM IN  
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**Abstract**

*Mangrove forest is one of the potential forest resources so that it has a very important role in coastal and marine ecosystems, especially coastal areas. The maintenance and management of mangrove ecosystems is a problem that must be faced together for the sake of the continuity and sustainability of mangrove forests. The purpose of this study was to analyze the magnitude of the potential direct and indirect benefits, the total economic value of the mangrove forest area in the ecotourism development of Langsa City. The analytical method used is the analysis of benefits and costs. For all types of functions and benefits of mangrove forest areas, the total economic value (TEV) is descriptively used. The results showed that the total value of economic benefits from the mangrove forest of Gampong Kuala Langsa, Aceh was Rp. 2.958.847.000,- of the month which was obtained from 1) the direct benefit value from fish, crabs, shrimp, shellfish and seafood processing was amounting to Rp. 213.710.000,- of the month, 2) The value of indirect economic benefits is Rp. 1.014.379.000,- of the month obtained from trading activities and renting boats. 3) The value of choice is Rp. 1.729.038.000, - of the month from biodiversity, 4) The value of being is Rp. 1.720.000, - of the month. There is a surplus of community consumers in their willingness to pay for the existence of mangrove forests of Rp. 2,705,054.12 of the month.*

**Keywords:** Total Economic Value, Mangrove Forest, Ecotourism, Kuala Langsa

**Introduction**

Based on the vision of the Mayor of Langsa in 2017 is to make Langsa City an advanced and Islamic service and industrial city, while the mission carried out is to continue urban planning to create a green, healthy, beautiful, comfortable, orderly and safe environment and improve the economic welfare of the community through structuring Mangrove ecotourism and development of tourism-aware communities in Kuala Langsa and around the mangrove forest ecotourism sites (Firmansyah, 2019). Through this vision and mission, sustainable development is urgently needed by combining environmental capabilities, natural resources and technology in order to preserve the mangrove forest environment in Langsa City. Langsa City is the first city in Aceh that has succeeded in developing the tourism sector of the mangrove ecosystem which is located in West Langsa District, Langsa City with an area of 8,000 hectare. (Langsa, 2018).

Mangrove forests are very decisive and support the level of social and economic development of the surrounding community (Lumbessy, Rengkung, & Gosal, 2015).

Based on the economic side, mangrove forests are producers of forest products that have very high economic value, such as wood, food sources, ingredients for cosmetics, materials for dyes and leather tanners, as well as sources of animal feed and bees (Suri & Purwanto, 2020). In addition, the mangrove forest is a habitat for various types of fish and shrimp as well as other animals (Al Idrus, Ilhamdi, Hadiprayitno, & Mertha, 2018). This is very supportive of improving the economy of the people living around the mangrove forest. The mangrove ecosystem is a unique and very interesting coastal ecosystem so that it contributes a lot or benefits to people's lives, both direct and indirect benefits that can be felt by people inside and outside Langsa City (Wardhani, 2011). Mangrove forests have aesthetic value, both from natural factors and from the life in them (Haryani, 2013). Mangrove forests provide a tourist attraction that is different from other natural attractions. The characteristics of the forest which is in the transition between land and sea has a unique and very beautiful natural charm so that it can be used as a natural tourist attraction by the community (Andiny, 2020). This can encourage the community both domestically and outside the domestic community to do mangrove forest tourism. However, as a result of the visit, the sustainability of the ecosystem is disrupted, this is due to the community's thinking that tourist attractions are shared property that can be used by anyone (Sahide, 2013). This results in excessive use which has an impact on the availability of increasingly scarce resources. Lack of knowledge and public awareness of the potential of mangrove forests as an economic value requires an economic assessment of the benefits and functions of mangrove forests (Zainuri, Takwanto, & Syarifuddin, 2017). The purpose of this study was to analyze the magnitude of the potential direct and indirect benefits, as well as to determine the total economic value of the mangrove forest area in the ecotourism development of Langsa City.

### **Research methods**

To calculate the potential benefits and economic value of the mangrove forest area in the ecotourism development of Langsa City, the method used is :

1. Direct benefits or Direct Use Value are types of benefits that can be obtained directly from mangrove forests or as a form of actual benefits carried out by the community, such as processing firewood, catching fish, catching crabs, catching shrimp, collecting shellfish and others, calculated using the equation Fauzi (2006) in  $TML = ML_1 + ML_2 + ML_3 +$

$ML_{4+n}$

Where :

$TML$  = Direct Benefit Value,

$ML_1$  = Direct Benefit Value of Firewood

$ML_2$  = Direct Benefit Value of Fishing

$ML_3$  = The Direct Benefit Value of Catching Crab

$ML_4$  = Direct Benefit Value of Collecting Shells.

$n$  = other immediate benefits.

2. Indirect Benefits (*Indirect Use Value*)



The calculation of indirect benefits of mangrove forests used the replacement cost method. Indirect benefits from mangrove forests are obtained from an ecosystem indirectly, namely in the form of physical, biological and ecological benefits (Pattimahu, 2010)

$$MTL = MTL_1 + MTL_2 + n$$

Where :

- MTL = Indirect Benefit Value,
- ML<sub>1</sub> = Indirect Selling Benefit Value
- ML<sub>2</sub> = Value of Indirect Benefits of renting a Boat/Ship
- ML<sub>3</sub> = Value of Other Indirect Benefits
- . n = other indirect benefits

3. The value of the benefits of the choice of mangrove forests can be calculated using the formula :

$$MP = MPb = (\text{USD } 15 \text{ per ha}) \times \text{Mangrove Forest Area}$$

Where ;

MP = choice benefits.

The calculation of the value of the selected benefits is obtained by converting the USD 15 per ha biodiversity value into rupiah value.

4. Total Economic Benefit Value (*Total Economic Value*)

According to (Dahuri, 2003), the calculation technique for assessing the economy of a resource, refers to the method of economic valuation or Total Economic Value (TEV). The value of the total economic benefits of mangrove forests is the sum of all the economic values of mangrove forest benefits that have been identified and quantified. Mathematically it can be formulated in the following equation:

$$TEV = ML + MTL + MP$$

Where :

TEV = *Total Economic Value*

ML = Immediate Benefits

MLT = Indirect Use Benefits

MP = Choice benefits

Summing up the benefits and functions of mangrove resources into value for money. The market value approach is used for commodities that can be directly traded, such as firewood, mud crabs and fish.

5. Existence benefits are the benefits felt by the community from the existence of the ecosystem under study after other benefits (direct, indirect and optional benefits). This benefit is the economic value of the existence (physical) of the studied ecosystem. The formulation is as follow:

$$ME = \frac{\sum_{i=1}^n (ME_i)}{n}$$

(entered into the value of Rupiah)

Where :

ME = Existence Benefits

ME<sub>i</sub> = Benefits of Existence from the 1st to the nth respondent

n = Number of respondents.

## **Results and Discussion**

### **1. Identification of the value of benefits and potential of mangrove forest ecosystems in Kuala Langsa Village, Aceh**

Based on the results of the research, the types of direct benefits from mangrove forests in Kuala Langsa Village are derived from processing firewood, catches of fishermen in the form of fish, shrimp, shellfish, crabs, and processing marine products. The type of indirect benefit is in the form of a mangrove forest ecosystem that is enjoyed by the community in generating other income such as selling, providing boat/boat rental services, fishing gear, being a parking attendant. With the existence of mangrove forests can provide employment, provide opportunities in business opportunities, as a place of recreation. Communities also play a role in maintaining ecosystems, so mangrove forests can prevent flooding, protect against wind and also serve as a place to increase knowledge (Utomo, Budiastuti, & Muryani, 2017). The Mangrove Forest in Kuala Langsa Village has the potential for ecotourism development, such as photo tours, boat facilities, culinary delights, observing the beauty of flora and fauna, a place to relax in the afternoon, cycling to enjoy the beauty around the mangrove forest and the beauty of the sunrise and sunset. Based on research by Ria Indrawan (2013), another potential of the mangrove forest in Margasari Village which has the opportunity to provide additional income for the surrounding community is the use of nipah leaves (*Nypa fruticans*). Palaes Village, West Likupang District, North Minahasa Regency shows that nipah leaves are used by communities around mangrove forests as the basic material for making house roofs (woka). The potential for environmental services of mangrove forests is to prevent pond water pollution by neutralizing substances or waste. The indirect benefit of the West

Nusa Tenggara mangrove forest is to prevent pond water pollution of IDR 1,354,931,610,000 per year. Based on the results of research by Ria Indrawan (2013), the people of Margasari Village still use temporary reservoirs to purify pond water. This shows that the potential for mangrove forest services in Margasari Village as a deterrent to pond water pollution is not yet optimal. Meanwhile, in Kuala Langsa Village, in purifying fish pond water, fishermen still use the potential of mangrove forest environmental services.

## 2. Direct Benefit Value of the Kuala Langsa Village Mangrove Forest, Aceh

The direct use value of mangrove forests is the benefits that are directly taken from natural resources (Ariftia, Qurniati, & Herwanti, 2014). Based on the results of the study, the value of direct benefits from mangrove ecosystem forests for the community is the production of fish, shrimp, crabs, processing of marine products such as crackers, salted fish, mangrove syrup and ecotourism as shown in Table 1 below:

Table 1.  
 Direct Benefit Value of Langsa City Mangrove Forest Ecosystem, Aceh

No	Direct Benefit Value Type	Rp Per month	%
1	Fish	58,200,000	27.23
2	Shrimp	15,040,000	7.04
3	Crab	52,320,000	24.48
4	Shell	37,940,000	17.75
5	Seafood Processing	24,560,000	11.49
6	Ecotourism	25,650,000	12.00
Total		213,710,000	100.00

Source: Primary data processed, 2021

The value of the benefits from the catch of fish is Rp. 58,200,000 or 27.23% with a total monthly production of 1,455 kg and an average selling price of fish of Rp. 40,000 per kg. The types and prices of fish produced vary greatly so that the income earned by fishermen also varies. Fish catches are also strongly influenced by time and season, where there are certain times that do not allow fishermen to go to the sea such as on Fridays, because this is a custom or tradition that exists in Aceh. The value of the benefits of shrimp production is Rp. 15,040,000 which is obtained from the catch of 376 kg of shrimp per month with an average price of Rp. 40,000 per kg. The catch of shrimp obtained by fishermen is very dependent on the type and size of shrimp obtained. If the shrimp is small, the price is cheap and vice versa, if the size is larger, the fishermen will get high income. Another direct benefit value is derived from the crab catch, which is Rp. 52,320,000 or 24.48% , this is the highest benefit value after the catch of fish. In addition to catching crabs around the mangrove forest, several communities also carry out crab cultivation activities in ponds. The total amount of catch and cultivation of crabs is 872 kg per month with an average sale per kg of Rp. 40,000.

The direct benefit value of shellfish is Rp. 37,940,000 or 17.75% obtained from the total production of shellfish per month of 1,048 kg per month with an average selling price of Rp. 35,000 per kg. The types of shellfish that are sought by the community around the Kuala Langsa mangrove forest are oysters, (bivalves) and green mussels. The activity of looking for oysters is a routine that many people do around the mangrove forest. The oysters that have been collected are then separated from the meat from the shell by the mothers in the area. Visitors to the mangrove forest can see firsthand the

process of separating mussel meat from the shell, because this activity is carried out on the side of the road leading to the mangrove forest. In addition to shellfish, the value of benefits from mangrove forests is the existence of processing products from the forest and the sea such as mangrove syrup made from processed mangrove fruit, sweets and tones, as well as residents who process the catches of fishermen's fish into salted fish and crackers. The value of benefits from marine processing is Rp. 24,560,000 per month or 11.49%. The value of direct benefits from mangrove forests is also obtained from the existence of mangrove forest tourism activities in Kuala Langsa Village, Aceh which is Rp. 25,650,000 or 12%. This value is obtained based on estimates of all travel costs (travel cost method) incurred by visitors to carry out tourism activities in the mangrove forest of Langsa City. Research conducted by Fatimah (2012) where the estimated economic value of the Tlanakan Coastal mangrove forest, Pamekasan Regency, East Java as an ecotourism destination, and shows a value of IDR 2,422,000.00 per year.

Thus, based on the potential of each direct benefit value of mangrove forests in Langsa City, the total direct benefit value is Rp. 213,710,000 per month and in one year the total value of the benefits obtained is Rp. 2,564,520,000. The results of research conducted by Ria Indrian Ariftia (2014) showed that the total direct use value of mangrove forests in Margasari Village was Rp. 11,299,500.00 per year. This difference occurs because each mangrove forest area in each area studied has different natural potentials and land areas.

### **3. Indirect Benefit Value of the Kuala Langsa Village Mangrove Forest Ecosystem, Aceh**

The value of indirect benefits is the value that indirectly benefits are felt (Alam, Supratman and Alif, 2009). Based on the results of observations and interviews, the indirect benefit value of the mangrove forest ecosystem of Gampong Kuala Langsa can be identified as in Table 2 below :

Table 2.  
Value of Indirect Benefits of Mangrove Forest Ecosystem Langsa City, Aceh

No.	Type of Activity Indirect Benefit	Rp Per month	%
1.	Trader	29.515.000	2,91
2.	Boat Rental	27.610.000	2,72
3.	Marine Biota Natural Feed	32.254.000	3,18
4.	Seawater Intrusion Barrier	300.000.000	29,57
5.	Courtyard Building Mangrove	625.000.000	61,61
Total		1.014.379.000	100,00

Source: Primary data processed, 2021

Based on the results of observations and interviews with respondents, the value of indirect benefits from trading activities around the Langsa City mangrove forest is Rp. 29,515,000 per month or 51.67%. As for trading activities carried out by the community around the mangrove forest, such as selling food and beverages drinks, coffee shops, hawker stalls, noodle and spice stalls and so on. The next type of indirect benefit is the respondent's activity in renting small boats and boats with a benefit value of Rp.27,610,000 per month. Almost the average resident's house around the mangrove forest has a small boat which is usually used for daily activities at work. When fishermen do not use boats, it will be rented out to tenants. Based on the information obtained by the researcher, the boat rental price is between Rp. 85,000 per hour to Rp.

200,000 per hour depending on the size of the boat used. In one week the average boat is rented for 4 to 8 hours, some even up to 3 days.

For the value of the benefits from the results of marine biota feed providers, it is a calculation using the fish feed price approach at the research site. The results of the research conducted by Agus Putra A. Samad in 2020, the total area of ponds in the Kuala Langsa mangrove forest area is 5,180 ha with abrasion and flood barriers of Rp. 300,000,000, - nutrient providers of 32,254 per ha. The indirect benefit value from the construction of the mangrove yard is Rp. 625,000,000,-. Based on the type of activity, the indirect benefit value of the Mangrove Forest Ecosystem in Langsa City, Aceh is Rp. 1,014,379,000.

#### 4. Preferred Value

Option value is the potential value that can be utilized for the future (Husin, 2019). The value of the choice of mangrove forest is estimated using the value of biodiversity (biodiversity). The biodiversity value of mangrove forests in Indonesia is US\$ 15 per hectare per year (Mayudin, 2013). The value of the choice of mangrove forest is obtained by multiplying the biodiversity value, which is US\$ 15/hectare/year multiplied by the area of the mangrove forest at the study site. Based on the Rupiah exchange rate at the time of the study (2021), 1 US\$ is Rp. 14,408.65 with an area of 8,000 hectares of mangrove forest in Langsa City, so the preferred value is Rp. 1,729,038,000. With this choice value, it shows that the mangrove forest in Langsa Mangrove City has very high intangible benefits (value of services and the environment) so it is important to estimate the economic value of mangrove forests into rupiah values so that people know how much the ecological value of mangrove forests has been neglected because considered to have no market value (Maulida, Supriharyono, & Suryanti, 2019). The results of this study are different from Mayudin's showing that the value of the choice of mangrove forests in Pangkajene Regency, South Sulawesi is Rp. 82,503,000.00 per year. The difference in the value of this choice is due to the smaller area of mangrove forest in Pangkajene Regency when compared to the area of mangrove forest in Langsa City. The results of the study are also different from the research of Ria Indrian Ariftia with the preferred value of Rp. 103,425,000.00 per year is also influenced by differences in the area of the mangrove forest.

#### 5. Existence value

Existence value is the value of one's concern for the existence of a natural resource (Fitri, 2018). Based on the results of the interview, it was found that the total value of willingness to pay given by respondents to the existence of mangroves in Langsa City as a heritage was Rp. 1,720,000,-

Table 3.  
 Value of Mangrove Forest Existence at Gampong Kuala Langsa, Aceh

WTPi(Rp per month)	Number of Respondents	WTP (Rp per month)	%
2,000	10	20,000	1.16
5,000	15	75,000	4.36
10,000	18	180,000	10.47
15,000	8	120,000	6.98
20,000	10	200,000	11.63
25,000	11	275,000	15.99

30,000	5	150,000	8.72
50,000	2	100,000	5.81
100,000	6	600,000	34.88
Total	85	1,720,000	100.00
Rwp		20,235.294	
%r		0.76	
Responden		75	
$Twp = Rwp \times P$		11,271,058.82	
$Tnp = \%r \times Twp$		8,566,005	
$Ts = Twp - Tnp$		2,705,054.12	

Source: Processed data (2021)

Description:

Rwp : Average willingness to pay for all respondents (Rp per year)

Twp : Total value of willingness to pay (Rp per year)

Tnp : Total value paid by all respondents (Rp per year)

Ts : Total consumer surplus (Rp per year)

%r : Percentage of respondents who are willing to pay

r : Number of respondents who are willing to pay

Based on the results of the study in one month there was a consumer surplus in the willingness to pay of Rp.2.705.054.12. Of the 85 respondents there are 24% who behave as free riders, namely people who only enjoy and use resources (mangroves) without making sacrifices. The free rider community stated that they did not want to pay for the existence of the mangrove forest due to their inability in the economy, they only used the mangrove forest.

## 6. Total Economic Value of Kuala Langsa Village Mangrove Forest, Aceh

The total economic value is the values contained in natural resources, which is the sum of all direct use values, indirect use values, choice values and existence values. The total economic value of the mangrove forest in Kuala Langsa Village, Langsa City, Aceh is Rp. 2,958,847,000,-

Table 4.

Total Economic Value of Mangrove Forest in Kuala Langsa Village, Langsa City, Aceh

No.	Value Type	Rp Perbulan	%
1.	Direct Benefit Value	213.710.000,-	7,22
2.	Indirect Benefit Value	1.014.379.000,-	34,28
3.	Preferred Value	1.729.038.000,-	58,44
4.	Existence Value	1.720.000,-	0,06
	Total	2.958.847.000,-	100

Source: Processed Data (2021)

Based on the results of the research, it can be explained in the chart of the Total Economic Value of the Mangrove Forest of Gampong Kuala Langsa, Langsa City Aceh below :



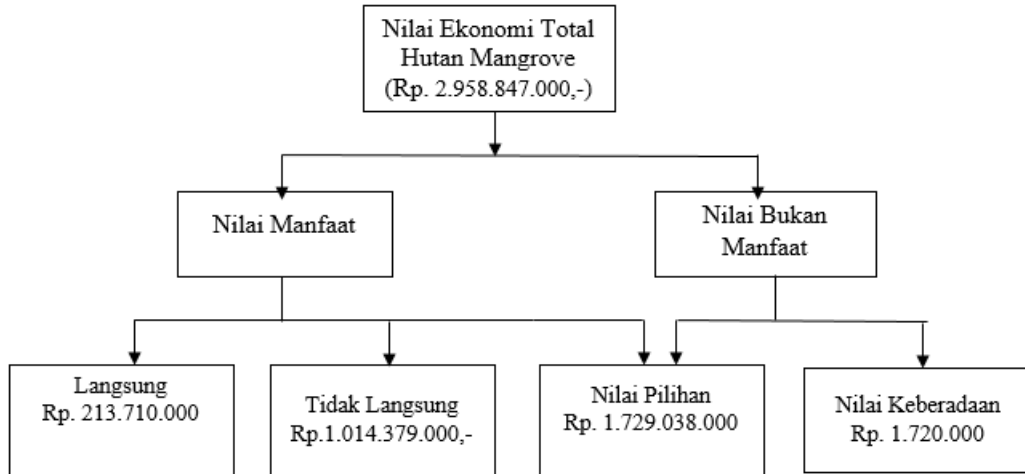


Figure 1. Total Economic Value of Langsa City Mangrove Forest, Aceh

Based on research conducted by Benu, Timban, Kaunang and Ahmad in the mangrove forest of Palaes Village, West Likupang District, North Minahasa Regency, the total economic value is Rp. 10,888,218,122.00 per year with an indirect use value of 97.99% or Rp. 10,671,627,482.00 per year. This means that the mangrove forest of Palaes Village has important benefits and functions as an economic resource and ecological resource for the lives of the people around it. Then the results of research conducted by Sofian, the total economic value of mangrove forests in Penunggul Village, Nguling District, Pasuruan Regency is IDR 5,195,443,820.00 per year with an indirect use value of 61.93% or IDR 3,217,760,180.00 per year. year. Shows that mangrove forests have very high intangible benefits (service and environmental value) so it is important to estimate the economic value of mangrove forests into rupiah values so that people can know that the ecological value of mangrove forests has always been ignored because they are considered to have no market value. Research conducted by Ria Indrian Ariftia et al, the results obtained that the economic value of mangrove forests is Rp. 10,530,519,419.00 per year which is obtained from (1) direct use value of Rp. 1,877,440,000.00 per year, (2) indirect use value. direct value of Rp. 8,915,036,479.00 per year, (3) option value of Rp. 103,425,000.00 per year and (4) existence value of Rp. 1,580.000,00 per year.

### Conclusion

Berdasarkan hasil penelitian dapat disimpulkan bahwa besarnya nilai ekonomi total hutan mangrove Kota Langsa, Aceh adalah Rp. 2.958.847.000,- perbulan. Nilai tersebut terdiri dari penjumlahan nilai manfaat langsung sebesar Rp 213.710.000,- per bulan, nilai guna tak langsung sebesar Rp 8.915.036.479,00 per tahun dari penyedia pakan alami bagi biota laut, nilai pilihan sebesar Rp 103.425.000,00 per tahun dari keanekaragaman hayati dan nilai keberadaan sebesar Rp 1.580.000,00 per tahun dari kesediaan membayar masyarakat

### References

- Al Idrus, Agil, Ilhamdi, M. Liwa, Hadiprayitno, Gito, & Mertha, Gde. (2018). Sosialisasi Peran dan Fungsi Mangrove Pada Masyarakat di Kawasan Gili Sulat Lombok Timur. *Jurnal Pengabdian Magister Pendidikan IPA*, 1(1).
- Andiny, Puti. (2020). Dampak Pengembangan Ekowisata Hutan Mangrove terhadap Sosial dan Ekonomi Masyarakat di Desa Kuala Langsa, Aceh. *Jurnal Samudra Ekonomi Dan Bisnis*, 11(1), 43–52.
- Ariftia, Ria Indrian, Qurniati, Rommy, & Herwanti, Susni. (2014). Nilai ekonomi total hutan mangrove desa Margasari kecamatan Labuhan Maringgai kabupaten Lampung Timur. *Jurnal Sylva Lestari*, 2(3), 19–28.
- Firmansyah, Rony Bachtiar. (2019). *Inovasi kebijakan transportasi publik: studi kasus program Suroboyo Bus membayar dengan limbah botol plastik*. Surabaya: UIN Sunan Ampel Surabaya.
- Fitri, Dwi Rini Kurnia. (2018). Valuasi ekonomi sumber daya alam dan lingkungan. *PROCEEDING IAIN Batusangkar*, 1(1), 125–134.
- Haryani, Nanik Suryo. (2013). Analisis perubahan hutan mangrove menggunakan citra landsat. *Jurnal Ilmiah Widya*, 1(1), 72–77.
- Husin, Azizah. (2019). Pengetahuan guru terhadap potensi sekolah untuk pendidikan nilai lingkungan hidup. *National Conference on Mathematics Education 2019*, 1(1), 234–242.
- Langsa, Badan Pusat Statistik Kota. (2018). *Kota Langsa Dalam Angka Tahun 2017*. Langsa (ID): BPS.
- Lumbessy, Henriyani, Rengkung, Joseph, & Gosal, Pierre H. (2015). Strategi konservasi ekosistem mangrove Desa Mangega dan Desa Bajo sebagai destinasi ekowisata di Kabupaten Kepulauan Sula. *Spasial*, 2(3), 192–200.
- Maulida, Gita, Supriharyono, Supriharyono, & Suryanti, Suryanti. (2019). Valuasi Ekonomi Pemanfaatan Ekosistem Mangrove Di Kelurahan Kandang Panjang Kota Pekalongan Provinsi Jawa Tengah Economic Valuation of Mangrove Ecosystem Utilization in Kandang Panjang Village, Pekalongan City, Central Java Province. *Management of Aquatic Resources Journal (MAQUARES)*, 8(3), 133–138.
- Mayudin, Arif. (2013). *Kondisi ekonomi pasca konversi hutan mangrove menjadi lahan tambak di Kabupaten Pangkajene Kepulauan Provinsi Sulawesi Selatan*.
- Sahide, Muhammad Alif K. (2013). *Hutan desa dan pembangunan sosial ekonomi masyarakat desa di Kabupaten Bantaeng*. Jakarta: Direktorat Bina Perhutanan Sosial Jakarta.
- Suri, Fatimah, & Purwanto, Hadi. (2020). Keragaman Tumbuhan Mangrove di Pesisir Kabupaten Siak Sebagai Pengendali Abrasi dan Ketahanan Pangan Masyarakat. *Jurnal Bioterdidik: Wahana Ekspresi Ilmiah*, 8(2), 48–58.
- Utomo, Bekti, Budiastuti, S., & Muryani, C. (2017). Strategi Pengelolaan Hutan Mangrove Di Desa Tanggul Tlare Kecamatan Kedung Kabupaten Jepara. *Jurnal Ilmu Lingkungan*, 15(2), 117–123.
- Wardhani, Maulinna Kusumo. (2011). Kawasan konservasi mangrove: suatu potensi ekowisata. *Jurnal Kelautan: Indonesian Journal of Marine Science and Technology*, 4(1), 60–76.
- Zainuri, Ach Muhib, Takwanto, Anang, & Syarifuddin, Amir. (2017). Konservasi ekologi hutan mangrove di kecamatan mayangan Kota Probolinggo. *Jurnal Dedikasi*, 14, 1–7.



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